

**RACHEL CARSON NATIONAL WILDLIFE REFUGE (RHC NWR)**

**Wells, Maine**

**Satellite Refuge**

**Great Bay National Wildlife Refuge (GRB NWR)**

**Newington, New Hampshire**

**ANNUAL NARRATIVE REPORT**

**Calendar Year 1998**

**U.S. Department of the Interior  
Fish and Wildlife Service  
NATIONAL WILDLIFE REFUGE SYSTEM**

**REVIEW AND APPROVALS**

**RACHEL CARSON NATIONAL WILDLIFE REFUGE (RHC NWR)**

**Wells, Maine**


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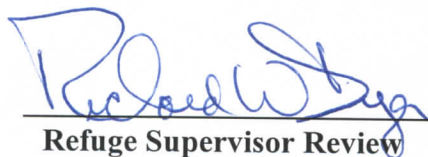
**Newington, New Hampshire**

**ANNUAL NARRATIVE REPORT**

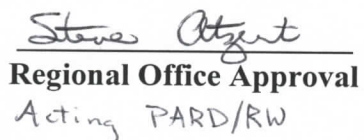
**Calendar Year 1998**


  
Refuge Manager

  
Date

  
Refuge Supervisor Review

  
Date

  
Regional Office Approval  
Acting PARD/RW

  
Date

## I. INTRODUCTION

The Rachel Carson National Wildlife Refuge was established to preserve wildlife habitat and critical waterfowl migration routes associated with southern Maine's coastal estuaries. During the mid-1800's southern coastal Maine supported teams of wildlife in its wetland habitats. Unfortunately, by the 19<sup>th</sup> century a recreational boom began with the construction of railways and trolley lines. Seasonal and vacation homes grew quickly on marsh edges. By the 1950s and early 1960s the developing land became a priority for those interested in the protection of these natural resources.

On December 16, 1966 the Coastal Maine NWR was established under the authority of the Migratory Bird Conservation Act. In a formal dedication ceremony on June 27, 1970, the Refuge was renamed in honor of scientist and author Rachel Carson, who spent much of her life along the Maine Coast. During the mid-1970s, the Refuge acquired 4,000 acres and has expanded the boundary several times over the years in an attempt to protect the diminishing marsh due to development. At present the Refuge's ten divisions stretch approximately 50 miles between Kittery and Cape Elizabeth and encompass nearly 5,000 acres.

Today, approximately 350,000 nature enthusiasts from all over the world visit the Refuge annually. Nature photography, hunting, field research and wildlife observation are some of the activities available on Refuge land.

Sport fishing, however, is a recreational activity that is not offered to the public by the Rachel Carson Refuge. There is a high demand for such an activity in accordance with numerous requests as well as evidence of illegal fishing. There are many areas within the ten divisions where the public can access refuge shores, mud flats, and marshes. Numerous streams, creeks and rivers - tidal and non-tidal, exist within refuge boundaries.

Fishing on Refuge land would provide the public with a wildlife oriented recreation as well as an education, experience and awareness of the environment. Increased awareness is important to help maintain a healthy environment as the public develops an understanding of their surrounding ecosystem and the roles which the U.S. Fish and Wildlife Service can play. The Refuge will also provide opportunities to utilize a renewable resource and maintain fish populations, an important step in maintaining a healthy ecosystem.

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## A. HIGHLIGHTS

## B. CLIMATIC CONDITIONS

The refuge is located along the southern coast of Maine. Weather conditions are moderated by the proximity of the ocean and data is obtained from the FWS-11 Fire Weather Station located at the refuge headquarters in Wells, ME.

This was a year for records. Maine set records for high temperatures in March and December.

Precipitation was approximately 5.5" above the 20-year average. January secured it's spot in climatology records with the ice storm of the century. The refuge escaped the first storm in early January, but not the second in late January. Thick ice coatings brought down numerous trees and branches. June was one of the coolest and wettest on record. Rainfall was above the 20-year average but snowfall was below the 20-year average.

TABLE B-1. Summarizes 1998 refuge temperatures (degrees Fahrenheit) and precipitation (inches).

<u>Month</u>	<u>Temperatures</u>		<u>Rainfall</u>		<u>Snowfall</u>	
	<u>Maximum</u>	<u>Minimum</u>	<u>20 Yr. Avg.</u>	<u>1998</u>	<u>20 Yr. Avg.</u>	<u>1998</u>
January	54	-1	3.78	3.43	19.1	14.0
February*	50	16	3.57	0.53	17.8	0
March	89	4	3.84	4.20	13.0	0
April	90	25	3.90	3.01	3.0	0
May	90	29	3.27	3.89	0.2	0
June	77	38	3.06	14.26	-----	-----
July	91	50	2.83	2.21	-----	-----
August	86	47	2.27	3.50	-----	-----
September	87	35	3.27	1.86	-----	-----
October	72	28	3.83	9.47	0.3	0
November	57	23	4.70	1.79	3.1	0
<u>December</u>	74	2	<u>4.51</u>	<u>0.97</u>	<u>15.5</u>	<u>6.0</u>
<b>TOTAL</b>			43.52	49.12	72.0	20.00

\* 7 Days of data-- weather station in for annual service.

## C. LAND ACQUISITION

### 1. Fee Title

The refuge received \$1.1 million for land acquisition from the Land and Water (L&W) Conservation Fund in 1998. The President's L&W budget did not mention Rachel Carson NWR; however, Friends of Rachel Carson and Trust for Public Lands consistently and effectively kept the need and opportunity before Service decision makers and members of Congress.

Top priority parcels were in Goosefare Brook and Biddeford Pool and the year's crowning achievement was acquisition of Seaside Estates, a tract of land at the mouth of Goosefare Brook. The Service has been trying to buy this land since the late 1980's. The acquisition effort followed a colorful route, including planning board decisions and election, zoning board reversals, FBI bribery charges, drug arrests, mayor's promises and an attorney's conflict of interest. Penultimately, after four appraisals, we did not have price agreement. The Nature Conservancy stepped in with the difference between the asking price and our appraisal. They also agreed to hold some clouded title land until we could clear title.

The following land tracts were acquired during 1998 to become part of the Rachel Carson NWR:

<u>Tract #</u>	<u>Division</u>	<u>Acres</u>	<u>Cost</u>
Tract 4125	Little River Division	7.74 acres	\$9,288
Tract 834	Biddeford Pool Division	3.0 "	\$45,000
Tract 1004	Moody Division	0.1 "	\$5,000
Tract 373c,d	Mousam River Division	24.13 "	\$14,400
Tract 29k	Brave Boat Harbor Division	30.75 "	Donation
Tract 11229	Moody Division	0.15 "	Donation
Tract 553d	Spurwink River Division	39.98 "	\$140,000
Tract 525	Goosefare Brook Division	5.6 "	\$600,000
Tract 525a	Goosefare Brook Division	26.92 "	Donation

According to Realty, the refuge was 4,797.93 acres in size at the end of 1998; approximately 64 percent of the 7,500-acre approved acquisition boundary.

### 2. Easements

The refuge administers two FmHA easements:

Gillespie Farm	North Yarmouth	80 acres
Young Farm	Cape Elizabeth	12 acres



Refuge personnel met with the North Yarmouth Town Manager in December to discuss the Gillespie farm. The town purchased most of the farm including almost all of the easement property west of the Royal River and is interested in establishing a trail on part of the easement. This would tie in with a trail along the Royal River to other town-owned lands. Refuge staff will be working with the town officials as they develop a more formal trail plan and to design interpretive signs.

### 3. Other

The refuge's boundary expansion process continued. Gulf of Maine programmers developed habitat suitability models and occurrence data for 46 declining species. Data was overlaid on several land cover layers to highlight areas important for our trust species. This geographic information system has become a vital tool to identify lands for inclusion in refuge boundaries.

The region wrestled with the proper role of the Land Acquisition Review Committee (LARC) when the Comprehensive Conservation Planning (CCP) process includes provisions for an orderly process and oversight, formally the purpose of the LARC. In June, the region convened the first LARC meeting in 2 years to consider the RCH boundary expansion. The committee agreed with the intent and scope of the expansion (approximately tripling the present size of the refuge) and addition of the York River Division, but recommended that the new boundary come from the public, CCP process. The refuge continues to take every opportunity to keep these expansion issues before the public.

## **D. PLANNING**

### 1. Master Plan

The Rachel Carson/Great Bay National Wildlife Refuge Complex is currently preparing its Comprehensive Conservation Plan (CCP). The National Wildlife Refuge System Improvement Act of 1997 required that all National Wildlife Refuges complete these documents in partnership with concerned citizens. This process enables the Complex to set management priorities and objectives for the next 15 years. To this end, we devoted much staff time to researching and drafting preliminary planning documents, preparing outreach materials (see Public Participation), and meeting with refuge and regional planning team members.

Major CCP accomplishments:

a. A habitat mapping project for the station's CCP was completed by the Gulf of Maine field office. The refuge received digitally generated maps on CD-ROM that will be used to identify priority habitat for the refuge land acquisition program.

b. Mailing lists of refuge neighbors, friends, professional contacts, and others were developed for both Rachel Carson and Great Bay refuges for information-sharing and project updates.



c. A 12-page Issues Workbook, the backbone of the CCP's significant public participation component, was drafted, approved, and distributed to the public.

## 2. Management Plan

ROS Taylor completed the annual hunting program for the 1998-1999 hunting season. The hunt program was changed from the previous year by eliminating all small game (rabbit, hare, squirrel) hunting, with the exception of pheasant. The basis for this was largely due to the State's concern over declining populations of the New England cottontail rabbit. This early successional habitat species is in decline due to loss of habitat. According to the state, the Eastern cottontail's range does not come this far north and the New England cottontail may be a candidate for State listing. Based on this information and the small proportion of refuge hunters engaged in small game hunting, the refuge discontinued this part of the program. Hunt fees were unchanged from the 97-98 season. Refuge hunters paid \$5 to hunt either pheasant, upland game or falconry and \$10 to hunt deer or migratory birds. Combination permits were available and the hunter paid combined fees.

In accordance with the Complex Fire Management Plan, Prescribed Burn Plans for 1998 were completed for both Rachel Carson/Great Bay and the Karner Blue Butterfly easement. The 1999 Prescribed Burn Plan for Rachel Carson and Great Bay was initiated in December. A burn plan to control cattail in Stubbs Pond at Great Bay NWR was written and approved in November.

The Wildlife Inventory Monitoring Plan was initiated in December. The plan was incomplete compared to surveys the refuge was undertaking and most of the procedures outdated. The plan should be complete in early 1999 and will help in completing all refuge survey plans.

## 3. Public Participation

As part of the station's Comprehensive Conservation Plan, significant public outreach efforts continued throughout the year. The refuge staff held a series of morning coffees, inviting visitors to discuss current operations and our conservation plan. Four press releases devoted to the CCP were sent to 15+ Maine and New Hampshire newspapers. Local public access cable stations ran notices about our efforts. The York County Coast Star, the refuge's local newspaper, ran a lengthy article about our planning work, resulting in greater public awareness. Leaflets were designed and distributed for our coffees and the availability of the Issues Workbooks.

Nearly 500 Issues Workbooks were mailed or distributed by both Rachel Carson and Great Bay refuges. The workbook provided background information about the project and a means by which concerned citizens could share concerns and thoughts on important refuge issues. To date, over 100 have been received by the refuge. Responses will be recorded and tallied and all individuals on our mailing list will receive follow-up summaries.

#### 4. Compliance with Environmental and Cultural Resource Mandates

In 1998, the station received museum property management software, an extensive database system for tracking cultural resources. In preparation for its use, ORP Bloomfield contacted the Maine State Museum in Augusta, where 2380 prehistoric items and 206 historic period items from the Rachel Carson National Wildlife Refuge Historic and Prehistoric Archeological Resource Survey (1994) were documented as being housed. A follow-up call from the registrar revealed that they had *no* Refuge cultural resources. The artifacts were with Richard Will, a member of Archeological Research Consultants, Inc., the firm that prepared the Survey. No transfer of property had ever taken place. In succeeding weeks, the items found their way to the Museum. Regional office and Washington staff were informed of the situation.

#### 5. Research and Investigations

##### a. Point Count Landbird Study

Bob Quinn, Merlin Enterprises of NH, was contracted to conduct migratory landbird surveys again in 1998. This was the fifth and final year for the Brave Boat and Upper Wells routes. Again in 1998, the routes were run only once and the fall migration survey was not conducted. The 1998 Breeding Bird Study report was received at the completion of the field season.

Results were not significantly different from previous years. The strong component of coniferous species was again present, including: black-throated green warbler and yellow-rumped warbler.

In 1997 we set up three new routes in the Spurwink River, Goosefare Brook and Goose Rocks Divisions. Attempts to recruit qualified volunteers have been unsuccessful with the exception of one for the Goosefare Brook route. That route was attempted on several occasions but was stopped due to poor weather in June. In July the individual was not available. They have expressed an interest in doing the survey in 1999.

##### b. Sharp-tailed Sparrow Surveys

The refuge cooperated for the second year with Tom Hodgman of the Maine Department of Inland Fisheries and Wildlife to conduct a survey of coastal saltmarshes for Nelson's and saltmarsh sharp-tailed sparrows. These species are high on the northeast Partners In Flight priority list. A challenge grant was funded for \$8,000 and transferred to IF&W for the project. Over 200 survey points were established in saltmarshes between Kittery and Thomaston, Maine. Over 100 were within and adjacent to the refuge. Two technicians hired by IF&W established the survey points, mapped them, surveyed each point four times during June and July, and collected vegetation data at each site. The refuge collected coordinate data using the GPS unit at survey points within and adjacent to the refuge.



c. Deer Tick Study

A Special Use Permit was given to Dr. Rand from the Maine Medical Center to conduct research on deer ticks.

d. Coastal Research at the Wells National Estuarine Research Reserve (WNERR)  
Reports for 1998 On-Site Research Projects\*

Investigators: Mark Bertness, Ph.D. and Patrick Ewanchuck  
Brown University, Providence, Rhode Island

Project Title: 1) Patch persistence and seedling dynamics in a Southern Maine marsh; and 2) Process and pattern in western Atlantic salt marsh plant communities: a biogeographic perspective.

Project Summary:

Bertness and Ewanchuck are investigating questions regarding the influence of climate, salt stress and drainage on basic salt marsh plant community processes. In 1998 they surveyed and mapped the distribution and abundance of the annual and perennial salt marsh plants in the Little River marsh to delineate the major marsh zones. They continued to record plant performance in experimental plots established in 1997. In these plots plant communities and drainage were altered to control both physical stresses and biological interactions. By monitoring the response of salt marsh plants to these alterations, they will learn about the factors that control salt marsh plant zonation. This zonation is a primary feature defining the ecology of salt marshes in New England. Preliminary results indicate that plant communities are altered dramatically by soil wetness, and that nitrogen availability may determine the location of plant zones. The results of the work in Maine is being compared to similar work these investigators are involved with in Florida, Georgia, and Rhode Island.

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Investigators: Theresa Theodose, Ph.D. and Justine Roths  
University of Southern Maine  
Portland, Maine

Project Title: Relationships between soil nutrient availability and species composition of a high salt marsh in southern Maine.

Project Summary:

Theodose and Roths are interested how soils factors influence the interaction between the dominant salt marsh grasses and the more patchily distributed forbs (other herbaceous plant species) in the salt marsh plant community. The relative abundance of grasses and forbs may be an indicator of the ability of salt marshes to persist in the face of sea level rise. These investigators have been measuring plant distributions and the availability of various forms of

phosphorous and nitrogen in salt marsh soils, at both undisturbed and restored marsh sites. In the undisturbed marsh, they found that forb patches occurred where phosphorous availability was high, and that plant production was negatively related to waterlogging and positively related to soil nitrogen. These patterns did not occur at the restored site, but nitrogen availability and grass production were higher in the restored marsh than in the undisturbed marsh, possibly due to the decomposition of peat in soils degraded as a result of many years of impoundment.

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Investigator: Lindsay Whitlow  
University of Michigan  
Ann Arbor, MI

Project Title: Integration of individual behavior and community dynamics to determine mechanisms by which the invasive green crab impacts populations of the native soft-shell clam.

Project Summary:

Whitlow is initiating a project to determine the mechanisms by which the invasive green crab impacts populations of the native soft-shell clam, to better understand how invasive species change native estuarine ecosystems. Preliminary results from short-term field experiments suggest that small size and shallow burial depth decrease survivorship of clams. Whitlow is currently analyzing green crab size data to determine population structure and variation in size classes from year to year. The relative size of the crabs and clams is a primary factor determining whether an individual crab can eat an individual clam.

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Investigator: Allison McKnight  
University of Massachusetts  
Amherst, MA

Project Title: Does green crab ecology vary with latitude?

Project Summary:

McKnight is interested in how the population dynamics, growth and reproduction of the invasive, clam-killing, green crab varies with latitude along the east coast. The Reserve is one of several sites where she has collected female egg-bearing crabs to measure aspects of their reproductive output and life history. Initial results indicate that crabs become reproductive at a smaller body size than is found at more southern sites.

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Investigator: Pamela Morgan  
University of New Hampshire, Durham, NH

Project Title: Functions and values of salt marshes in northern New England: a comparison of fringing marshes and back barrier marshes.



### Project Summary:

Morgan has been comparing the functions of two common salt marsh forms, the back-barrier marsh and the fringing marsh, at a dozen sites from Biddeford Pool to the Great Bay in NH. She has been measuring sediment deposition, organic matter in sediments, plant diversity, aboveground biomass and belowground biomass and wave energy attenuation to characterize the value of fringing and back-barrier marshes in terms of biological production and shoreline protection.

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Investigators: Michele Dionne, Ph.D.; Duncan FitzGerald Ph.D.; Joseph Kelley, Ph.D.; Peter Rosen, Ph.D.; David Burdick, Ph.D.; Larry Ward, Ph.D.; and Roelof Boumans, Ph.D.

Wells National Estuarine Research Reserve; Boston University; University of Maine; University of New Hampshire; Northeastern University; and University of Maryland

Project Title: Estuarine responses to dredging: analysis of sedimentary and morphological change in a back barrier marsh to aid local management and develop a regional management tool

### Project Summary:

This group of geologists and ecologists is studying patterns of erosion and accretion in the salt marshes of the Webhannet River estuary. In 1998, baseline channel cross-sectional profiles were established and monitoring of suspended sediments was initiated. Full data collection including sediment deposition, vegetation, and water flow will not begin until the spring of 1999. These data will be collected both before and after the dredging of Wells Harbor, to compare marsh sedimentary processes in the year before and the year after a dredging event.

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Investigators: Michelle Dionne, Ph.D. and Brian Beal, Ph.D.

Project Title: Effects of elevation and sediment type on survival and growth of juvenile softshell clam.

### Project Summary:

This experiment was designed to determine the best locations for planting seed clam to enhance the recreational shellfishery in the Webhannet River estuary. Newly hatched clams were seeded in large plots at four locations with differing sediment types. During this first year, all plots were covered with protective mesh to help reduce green crab predation. At the beginning of year two of the experiment (1999 growing season) the mesh will be removed. At each location two plots were located high in the intertidal zone, and two in the lower intertidal. The lower intertidal clams will be submerged more of the time, increasing the time available for filter feeding. However, they will also be accessible to predatory green crabs for longer periods. Clams will be



harvested at the end of the 1999 growing season. Preliminary sampling indicates wide variation in survival, with most locations averaging between 20% and 40%. At most sites, there was no consistent difference in survival between upper and lower intertidal. Growth was very consistent, except for two locations in the lower intertidal, a surprising result.

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Investigators: David Burdick, Ph.D. and Roelof Boumans, Ph.D.  
University of New Hampshire, University of Maryland

Project Title: Sediment elevation dynamics in salt marshes: functional assessment of accretionary biofilters.

Project Summary:

This investigation addresses questions regarding the ability of salt marshes to maintain elevation with respect to sea-level rise. This function was compared between marsh areas with normal hydrology and an area where tidal flow is severely restricted by a culverted causeway. In 1997 six sediment erosion and accretion tables (SETs) were established throughout the Webhannet River estuary, and marker horizons were established within the vicinity of each table. The SETs measure annual changes in elevation on a millimeter scale, while marker horizons measure the rate of sediment accretion. In 1998 elevation and accretion was measured in the spring and fall. At least another year of data is required before any patterns will emerge. This project will compare SET data from numerous sites along the US Atlantic seaboard.

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Investigators: Peter Rand, M.D.; Chuck Lubelczyk; Robert Smith, M.D.

Project Title: Ecological determinants of the spread of the tick vector of Lyme disease and other pathogens.

Project Summary:

These scientists have been investigating ecological factors that affect the life cycle of the Lyme disease bacterium at the Reserve since 1990. During 1998 they monitored the reproduction of deer ticks in buried containers to determine the influence of soil temperature and moisture on tick population dynamics. They also monitored tick populations, tick loads on small mammals and birds, and Lyme disease bacterium infection rates in collected ticks. The percent of birds infested, and the infection rate of the ticks on birds have increased over time. Bird species differ in their ability to infect ticks with the bacterium. Deer tick populations are high at the Wells NERR, and a high percentage of ticks carry the bacterium (> 50%). Two other human pathogenic organisms have been isolated at low frequency from deer ticks collected at the Wells NERR.

Investigator: June Ficker

Project Title: Monitoring avian productivity and survivorship.

Project Summary:

This is a long-term bird monitoring project, begun in 1989 as part of the MAPS program organized by the Institute for Bird Populations. Six to eight mist nets are set one day per week throughout the breeding season and all birds captured are identified, measured and banded. Replicate nets are set in open, forested, and old field habitat. Up to 300 birds are captured, banded and released each year. The number of banded returns has increased over time. No obvious trends have emerged from the data as of yet, although in 1992 capture rates were much lower than in other years.

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Investigators:

Project Title: Estuarine non-point source pollution monitoring

Project Summary:

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**WET**

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**DEER**

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\* This report includes summaries only for those projects for which data was collected within the boundaries of the Wells NERR in 1998.

#### Relevant Research Reports and Publications 1997-1998

Burdick, D., M. Dionne, R. Boumans and F. Short (1997) Ecological responses to tidal restoration in two New England salt marshes. *Wetlands Ecology and Management* 4:129-144.

Dionne, M., D. Burdick, R. Cook, R. Buchsbaum, and S. Fuller (1998) Scoping paper 5: physical alterations to water flow and salt marshes: protecting and restoring flow and habitat in Gulf of Maine salt marshes and watersheds. Final draft of a working paper. Commission for Environmental Cooperation and Global Program of Action Coalition for the Gulf of Maine. 68 pp.+ appendices.

Dionne, M., F. Short, and D. Burdick (1998) Fish utilization of restored, created and reference salt marsh habitat in the Gulf of Maine. *American Fisheries Society Symposium 22: Fish habitat: Essential Fish Habitat (EFH) and Rehabilitation* (in press).

Dionne, M. (1997) Animal interactions and secondary productivity in northeastern tidal marshes. Pages 19-24 in R. A. Orson, R. S. Warren, W. A. Niering and P. Van Patten (eds),



*Research in New England Marsh-Estuarine Ecosystems: directions and priorities into the next millenium.* Connecticut Sea Grant Publications, University of Connecticut, Groton.

Dionne, M. (1997) Nutrients and dissolved oxygen in Maine estuaries and embayments. Final data report submitted to New England Interstate Water Pollution Control Commission. 46 pp including appendices.

Gehrels, W. R., D.F. Belknap, J.T. Kelley (1997) Integrated High-Precision Analyses of Holocene Relative Sea-Level Changes, Lessons From the Coast of Maine. *Geological Society of American Bulletin* 108: 1073-1088.

Kelly, J. R. (1997) Dissolved oxygen in Maine estuaries and embayments: 1996 results and analyses. Report submitted to Wells National Estuarine Research Reserve. 89 pp including appendices.

Maine State Planning Office (1998) Improving Maine's beaches: recommendations of the Southern Maine Beach stakeholder group. 16 pp.

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Moser, Susanne (1998) Talk globally, walk locally: the cross-scale influence of global change information on coastal zone management in Maine and Hawaii. ENRP Discussion Paper E-98-16, Kennedy School of Government, Harvard University. 60 pp. [the Wells NERR was one of many interviewees that contributed to this study.]

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## 6. Other

In March ROS Taylor attended the annual piping plover/least tern cooperators meeting at Maine Audubon in Falmouth. The Refuge takes the lead for all plover/tern activity on Refuge lands and assists at other sites as time and staff are available.

In December ROS Taylor attended the Atlantic Coast Piping Plover Workshop at the National Conservation Training Center (NCTC) in Shepherdstown, WV.

## **E. ADMINISTRATION**

### 1. Personnel

- a. Ward Feurt, Project Leader, GS-12, PFT, EOD 09/18/95  
Promoted to GS-13, 6/7/98.
- b. Debra Kimbrell-Anderson, Deputy Refuge Manager, GS-11, PFT, EOD 01/23/92
- c. Graham W. Taylor, Refuge Operations Specialist, GS-9, PFT, EOD 06/24/93
- d. Betty Champagne, Office Assistant, GS-5, PFT, EOD 09/01/96  
Promoted to Administrative Assistant, GS-6, PFT, 05/24/98
- e. Susan A. Bloomfield, Outdoor Recreation Planner, GS-11, PFT, EOD 09/14/97
- f. Rachel Cliche, Student Career Experience Program (SCEP) Student, GS-4, TFT, EOD 5/24/98 - 8/30/98
- g. Lisa Loncar, Forestry Technician, GS-4, TFT, 3/29/98 - 10/10/98
- h. Chris Schumacher, Forestry Tech., GS-4, TFT, 3/29/98 - 7/4/98
- i. Kurt Thompson, Forestry Technician, GS-4, TFT, 7/5/98 - 10/10/98





6/3/99

Left to Right (Front): Betty Champagne, Rachel Cliche, Susan Bloomfield  
Left to Right (Back): Graham Taylor, Ward Feurt, Debra-Kimbrell-Anderson



The refuge received 9251 fire funding for two forestry technician positions for prescribed burning during the 1998 field season. Lisa Loncar and Chris Schumacher were selected for the two positions. Kurt Thompson replaced Chris, who accepted a position with the U.S. Forest Service at Coos Bay, Oregon in late June. Lisa and Kurt returned to Noxubee NWR, MS at the end of their appointment to fill career-seasonal fire positions.

2. Youth Programs

3. Other Manpower Programs

4. Intern/Volunteer Program

Over 296 volunteer days were devoted to assisting staff with refuge operations. From May through August, three college students, Michelle Marceau, Heather Hamilton and Mark Slomiany joined us. They assisted with refuge management, public use programs, and maintenance. Among other successes, Michelle lead the piping plover/least tern monitoring program and worked additional weeks to research ownership and tax maps for our "Refuge Neighbors Project;" Heather conducted shorebird surveys and monitored nearly 40 songbird nest boxes on all divisions of the refuge; and Mark rerouted a segment of the Carson Trail near the Branch Brook slide. Thanks to the interns, the refuge headquarters remained open from 10:00 a.m. until 2:00 p.m. on weekends this summer.

Volunteers were busy as well. The Carson trail received much-needed attention: University of New England students removed storm debris from the trail and raked it clean; and in May, high school students replenished tread material at the farthest reaches of the trail. Ice storm damage on the refuge residence was repaired by a carpenter. A local Francophile completed a first draft of a "Carson Trail Guide" French translation. Another bilingual volunteer is reviewing it. A list of Rachel Carson's writings was prepared by a volunteer via information on the Internet. Nest boxes around the refuge were cleaned and maintained by a former volunteer (who later became our Fire Technician) just as their intended residents arrived.

5. Funding

The station's FY '98 Bluebook subactivity 1261 fund target was \$323,200. This included \$8,000 for Saltmarsh Avifauna (C511) and \$1,000 for Environmental Education (C542), both Challenge Grant projects; and \$13,500 for hydrocarbon characterization at Rachel Carson NWR. Additional funding of \$22,100 for small maintenance projects\* and \$34,500 for fire management were also received for the fiscal year. Two seasonal Fire Technicians, fire equipment and "normal unit strength" materials were funded with fire management funds. Funding not included in the fund target but allocated to the refuge, was \$23,000 for a general station brochure and \$13,000 for an interpretive kiosk and exhibits--both to be funded from the pilot fee program with the 20% of "fee" funds held in the Regional Office.

\*The project to repair the main office floor was funded primarily with FY 1998 funds and the remaining \$1,935 with FY 99 funding. The station's MMS driveway paving project was initially planned for FY 98, but funding was later rescinded.

#### Funding for 1998 and Previous Years

1998:	\$415,800
1997:	
1996:	
1995:	
1994:	
1993:	
1992:	\$126,930
1991:	\$125,000
1990:	\$171,000
1989:	\$139,122
1988:	\$123,117
1987:	\$142,493
1986:	\$ 69,735

#### 6. Safety

As a complex, refuge personnel worked on addressing non-compliant items noted in the 1997 environmental audit. Remaining items should be completed in 1999.

ROS Taylor gave a farm tractor training session to the forestry techs and staff at Great Bay NWR in July. This was done to facilitate completely mowing grass fields at Rachel Carson NWR and Great Bay NWR.

Refuge staff attended Defensive Driver Training at Great Bay NWR in October.

ROS Taylor and Great Bay Bio-Tech O'Brien completed the Motorboat Operator and Safety course at Montezuma NWR, NY in September.

Several staff attended OAS Aircraft Safety Training at the R5 Regional Office during the year.

Because it is very difficult to get all staff from Rachel Carson and Great Bay together at one time for safety meetings. In August, the station developed monthly safety memos to staff, interns and volunteers. Subject matter covered a wide array of topics, but generally targeted issues for the specific time of year. Material for the memo was derived from RO memos and information, the Internet, and several other sources.

## 7. Technical Assistance

The Rachel Carson Administrative Assistant provided support to Great Bay NWR one day a week for bill paying and other needs. Assistance was also provided to the North Zone Biologist stationed at Great Bay NWR.

## 8. Other Items

ROS Taylor finally attended the Refuge Management Training Academy in April-May at the National Conservation Training Center (NCTC), in Shepherdstown, WV.

## 9. North American Waterfowl Management Plan Progress Report

# F. HABITAT MANAGEMENT

## 1. General

*Types of habitat* found at Rachel Carson NWR are quite diverse. Coastal saltmarsh is at its northern limits in Southern Maine. Rachel Carson NWR and the Scarborough Marsh State Wildlife Management Area encompass approximately 85% of all saltmarsh habitat in Maine. The rocky coast, typical of the state, is also present and interspersed with sandy shores and barrier beach islands.

## 2. Wetlands

Tidal saltmarsh constitutes the majority of wetlands occurring on Rachel Carson NWR.

In March, wetland contractor, SWAMP, Inc., began working on several restoration sites within the Goose Rocks Division in Kennebunkport. Three sites were restored--one with numerous ditches, one with a large ditch, and one where a small hand-dug ditch drained several acres. All sites were completed by early spring, using ditch plugs from existing site material. Marine-grade plywood was also used on several sites on the downstream side to allow plugs to stabilize without being subjected to tidal action. The last site had undermined late in the year and will be repaired in early 1999. Marine plywood will be utilized at this site as well.

In June, Rachel Carson staff, along with heavy equipment operators, Jim Bohm from Iroquois NWR, NY, Dave Nicely from Erie NWR, PA, Don Lima from McKinney NWR, CT and Great Bay NWR staff, installed a water control structure (WCS) in the Upper Peverly Pond dike at Great Bay, despite several obstacles.

In August, Stewart and Cole repaired the dike around the water control structure at the Brown St. Pond on the Mousam River Division. This was the third time the dike and WCS have been repaired since 1996. Heavy rain events after each repair caused dike failures each time. As of



the end of the year the dike was intact and vegetation establishing nicely. Stoplogs will be placed in the WCS and water levels controlled next year.

During the year, refuge staff, the North Zone Biologist, and wetland contractor, SWAMP, Inc., met to discuss and select 1999 restoration sites. Two sites with several ditch plugs were selected for possible restoration. One at the Moody Division and the other at the Little River Division. The contractor is developing permit applications. These projects will be completed in 1999.

### 3. Forests

Forested uplands constitute approximately 25 percent of the total refuge acreage and consist primarily of the oak, hemlock, and white pine communities typical of coastal, southwestern ME.

Two units of the refuge, Brave Boat Harbor and the Upper Wells/Mousam River Divisions have been identified as outstanding examples of unique habitats in Maine. Personnel from the Maine Forest Diversity project have spent the last few years conducting field work to identify and inventory potential candidates for a system of ecological reserves.

### 4. Croplands

### 5. Grasslands

In June, Jim Bohm, heavy equipment operator from Iroquois NWR, NY, arrived for a two-week detail to run the regional Hydro-Axe at several sites on Rachel Carson, as well as at Great Bay and Karner Blue NWRs. Jim used the axe to cut back encroaching woody vegetation in the Libby field on the Spurwink River Division and at Cutts Island fields at the Brave boat Harbor Division. Due to the spread out nature of the refuge complex, including Great Bay and Karner Blue, as much time was spent transporting the machine from site to site as in its operation. However, Jim did a great job and we look forward to continuing reclaiming and restoring our grassland units.

In August, ROS Taylor met with Geoffrey Coombs of the York County National Resource Conservation Service (NRCS) office to look at several grassland units of the refuge and discuss management/restoration of the units with an emphasis on warm season grasses.

The Moody, Littlefield and Houston fields were mowed in late 1998. Because we don't have our own equipment, we must wait until equipment from other stations is available, usually late September, when things are just too busy. Additionally, it probably isn't worth the time and effort to mow in October and November. We now have a truck and trailer to move a tractor, but still have to borrow one.

## 6. Other Habitats

The Crescent Surf Beach piping plover nesting area had less suitable nesting habitat in 1998. Several storms caused some beach loss due to erosion, particularly at the south end and vertical faces. At one point in September, vegetation was less than two feet wide and the beach appeared to be almost cut in two. By October the south end had moved northward about 40 feet into the Little River and the beach was severed, creating an island out of the former south end. It will be interesting to see how things shape up in 1999.

The refuge is still interested in managing barrier beach habitat, specifically for least terns and piping plovers. Limited information was received from State tern and plover coordinators along the Atlantic Coast. The Maine plover/tern working group is very interested in conducting some habitat management for the species. A proposal will be developed during the winter months and hopefully implemented in 1999.

## 7. Grazing

## 8. Haying

## 9. Fire Management

The Refuge Fire Weather Station was sent in for service and returned in February.

The Prescribed Burn Plans for the Rachel Carson/Great Bay NWR complex and for the Concord Pine Barrens-Karner Blue Butterfly were completed and approved in April and May respectively.

The refuge complex received FY 98 funding for two seasonal forestry techs to implement prescribed burning. Lisa Loncar and Chris Schumacher were selected for the positions and started in late March. Chris resigned in late June to take a position with the U.S. Forest and Kurt Thompson was selected to fill the remainder of the position.

During the year, the refuge accomplished burns on three units (Cutts Island, Brown Street, Libby Field) covering 13 acres at Rachel Carson. These were the first prescribed burns conducted on the refuge. Refuge staff also conducted 4 burns at Great Bay NWR, covering 40 acres. In addition to these burns, the seasonal staff also attended and assisted with S-130/190 in April at Moosehorn NWR. In May, they assisted Sunkhaze Meadows NWR with burns, as well assisting the Maine chapter of TNC with burns in Kennebunk. In June, they completed a three-week fire-fighting detail at Bitter Lake NWR, NM. In August they joined a fire crew from Cape Cod National Seashore, MA and went to Montana.

When not burning the seasonal forest techs posted Fire Management Unit boundaries, conducted hazardous fuel inventories, mapped fuel models, established and monitored vegetation plots in burn units, created a fire break at Great Bay NWR, reduced fuel hazards at Great Bay, mechanically treated 30+ acres of grasslands at Great Bay, conducted literature searches for



information regarding use of fire in control of exotics, inventoried, checked, maintained and repaired fire equipment at both Rachel Carson and Great Bay. They also assisted an intern with a presentation on the Rachel Carson NWR prescribed fire use for habitat management program.

No burns were conducted at the Karner Blue Butterfly easement in Concord, NH this year. After completing the plan, successful contact was eventually made with the Concord airport officials, where most of the units were located. Airport/City of Concord officials denied permission to burn the units. The Concord ES office and City did not see eye to eye on a development project the airport/City wanted done on another portion of the airport, so the refuge was not allowed to burn. Hopefully, things will be better in 1999. Burns are conducted to maintain and improve habitat for the federally endangered Karner Blue Butterfly. The Concord pine barrens supports the only species population in New England.

The refuge submitted several FirePro requests for the FY99 fire budget, which again included hiring two seasonal firefighters.

The Great Bay bio-tech, office assistant and Rachel Carson Fire Tech Schumacher attended S-130/190 Basic Firefighter training at Moosehorn NWR, ME in April.

DRM Kimbrell-Anderson attended the S-205 Fire Operations in the Urban Interface course on Long Island, NY in October.

ROS Taylor attended the RX-340 Introduction to Fire Effects course at Green Mountain National Forest, Vermont in November.

#### 10. Pest Control

In August 1995 and July 1997, Rachel Carson NWR received and released *Galerucella* sp. beetles on Tract 170 in the Lower Wells Division to biologically control purple loosestrife. In July of 1996, the refuge released *Hylobius* sp. eggs received from Sunkhaze Meadows NWR. No *Hylobius* adults were observed, although they can take up to two years to emerge. Some of the *Galerucella* did survive the 1997 release; however, no significant damage to purple loosestrife is apparent.

In 1998, an additional 2500 *Galerucella* sp. beetles were released at the Wells site and 500 released at a new site on the Spurwink River Division in Scarborough.

In June and August, Interns and staff surveyed established monitoring plots in Wells and established and monitored new plots at the Spurwink River site. Monitoring follows protocols established at Cornell University.

The refuge submitted a pesticide use proposal to apply Rodeo to several stands of phragmites in the fall. Stand size varies from less than 1/4 acre to 2 acres in size at this time. Approval was granted and in September, Mike Morrison from SWAMP, Inc., who is also a licensed Maine

applicator, applied Rodeo to 4 of 8 sites. These sites will be burned in early 1999. Additional sites will be considered and another proposal submitted in early 1999.

Refuge staff continued identifying additional sites with purple loosestrife and recording the locations along with Phragmites sites.

11. Water Rights
12. Wilderness Special Areas
13. WPA Easement Monitoring

## **G. WILDLIFE**

### **1. Wildlife Diversity**

A wide variety of species utilize the refuge due to the diversity of habitats both on and adjacent to the refuge. Over 250 bird species have been recorded. Many mammal and reptile species are also present, some at the limits of their ranges.

### **2. Endangered and or Threatened Species**

Below is a current State of Maine listing of endangered and threatened species that occur or may occur on the refuge:

<u>Species</u>	<u>Status</u>
Golden Eagle - <u>Aquila chrysaetos</u>	Endangered
Peregrine Falcon - <u>Falco peregrinus</u> *	Endangered
Piping Plover - <u>Charadrius melodius</u> **	Endangered
Roseate Tern - <u>Sterna dougallii</u> *	Endangered
Least Tern - <u>Sterna antillarum</u>	Endangered
Black tern - <u>Chlidonias niger</u>	Endangered
Sedge Wren - <u>Cistothorus platensis</u>	Endangered
Grasshopper Sparrow - <u>Ammodramus savannarum</u>	Endangered
Bald Eagle - <u>Haliaeetus leucocephalus</u> **	Threatened
Harlequin Duck - <u>Histrionicus histrionicus</u>	Threatened
Arctic Tern - <u>Sterna paradisaea</u>	Threatened
Upland Sandpiper - <u>Bartramia longicauda</u>	Threatened
Box Turtle - <u>Terrapene carolina</u>	Endangered
Black Racer - <u>Clouber constrictor</u>	Endangered
Blanding's Turtle - <u>Emydoidea blandingii</u>	Endangered
Spotted Turtle - <u>Clemmys guttata</u>	Threatened

- \* Federally listed Endangered Species
- \*\* Federally listed Threatened Species

a. Piping Plover

The refuge has one of the most annually productive sites piping plovers and least terns at Crescent Surf Beach in Kennebunk. Plovers again nested at Marshall Point on the Goose Rocks Division in Kennebunkport. The refuge supports about 10% of the entire population in Maine annually. Additionally, between 50 and 75% of the Maine population nests on or near the refuge.

In the last few years, a pair of plovers has nested near the mouth of Goosefare Brook. The refuge owns some postage-stamp size lots, where the birds nest. Plovers were nesting just off refuge property in 1998, but will be on the refuge in 1999 since we have recently acquired that area.

Due to significant changes in the beach at Crescent Surf in 1998, only three pair nested. Five piping plovers were observed at Crescent Surf Beach on March 30. Three pair nested five times, two successfully. A total of 17 eggs were laid, of which 7 hatched with 6 fledglings. One pair nested on a shelf on an almost sheer face of eroded dune. The eggs disappeared, probably due to avian predation. Shortly thereafter, the nest site was destroyed by further erosion.

The pair of plovers at the Marshall Point site successfully hatched four chicks, but all were lost to predation. A fox was observed a few days after the disappearance and a den was located on the back side of the dunes in December.

The pair at Goosefare Brook nested twice. Maine Audubon monitored that site, which fledged one chick.

TABLE G-1. Nesting success at Crescent Surf Beach during the last 8 years.

Year	# of Pairs	# Pairs Nested	# of Nests	# of Chicks	# Fledged
1998	3	3	5	7	6
1997	4	4	4	14	12
1996	5	5	5	18	14
1995	5	4	8	10	9
1994	4	4	4	15	11
1993	4	4	4	16	16
1992	4	4	4	16	16
1991	3	3	3	12	9



Restricted area signs were erected at the Marshall Point site and residents were informed that the beach had been closed to protect the nests and birds.

Refuge staff cooperated with other plover monitoring agencies on other area beaches as time allowed. These included: Laudholm, Drakes Island, Wells, and Ogunquit Beaches.

Refuge staff conducted surveys of several local beaches during the International Piping Plover Census in June. Beaches surveyed included: Seapoint and Crescent Beaches in Kittery; Cape Neddick Beach, York; Laudholm Beach, Wells; Crescent Surf and Parsons Beaches, Kennebunk; and Marshall Point Beach, Kennebunkport.

#### Least Terns

Least terns continued to have poor productivity. Crescent Surf Beach was the only area of Rachel Carson NWR utilized by least terns for nesting activities. Beginning in early June, courtship and nesting activity between pairs of least terns became increasingly more evident (presenting each other with herring, scraps in the sand, etc.). On July 8, approximately 44 adults and 20 nests with 30 eggs were observed. On July 10, only 12 active nests were located, containing 27 eggs. The first chick was found on 7/24 and by 8/9 seven chicks were observed. The first fledged bird was observed on 8/13, four observed on 8/18 with 2 chicks. It is estimated a whopping 7 chicks fledged at Crescent Surf Beach. Dismal as it is, this is the best since 1995, and constitutes 70% of the entire production for Maine in 1998!

Least terns were frequently observed at Laudholm Beach; however, none were observed nesting on the beach this year.

Table G-2. Number of nesting pairs and fledgling () piping plovers and least terns at Crescent Surf Beach, Laudholm Beach and Statewide during the last ten years.

YEAR	PIPING PLOVER			LEAST TERN		
	Crescent Surf	Laudholm	Statewide	Crescent Surf	Laudholm	Statewide
1998	3(6)	2(3)	60+(?)	22(7)	0(0)	@60(10)
1997	4(12)	1(2)	47(93)	18(1)	0(0)	@60
1996	5(14)	1(4)	50()	16(0)	0(0)	60(30)
1995	4(9)	1(2)	40(95)	25(9)	8(0)	100(16)
1994	4(11)	1(3)	35(70)	35(32)	12(13)	89(79)
1993	4(16)	1(4)	32(76)	64(62)	1(3)	125(114)
1992	4(16)	1(0)	24(49)	15(42)	14(11)	94(123)
1991	3(9)	1(3)	18(45)	0	1(1)	52(25)

1990	3(4)	0	17(26)	16(6)	0	65(44)
1989	2(3)	0	16(38)	46(0)	0	83(8)

Bald eagles are seen every winter in the Biddeford/Saco area feeding along the Saco River. The dams on the river maintain open water and provide a feeding area.

Peregrine falcons also utilize refuge marshes each spring and fall. Peregrine falcons were observed at Biddeford Pool and in Wells during 1998.

Several roseate terns were observed feeding in Biddeford Pool and along Crescent Surf Beach. There is a nesting colony on an island near Biddeford.

### 3. Waterfowl

*Situated along* the southern Maine coast at the northern limits of large saltmarsh tracts, the refuge provides habitat for breeding, migrating and wintering waterfowl. Breeding populations are small and include Canada geese, black duck, mallard, wood duck, teal and common eider.

Migrating waterfowl populations are relatively small and include pintail, widgeon and ring-neck ducks. Offshore, migrating species include scoters, eiders, mergansers and Oldsquaw.

The most use during the year is from wintering waterfowl. Black ducks are the most common wintering species and with open water can be found on every marsh and river. Groups of common eider, common goldeneye, bufflehead and red-breasted merganser can be found in river mouths and in the waterways of the saltmarshes.

On September 29 and October 26, aerial surveys of the entire refuge were conducted. In addition to Rachel Carson NWR, the York River and Scarborough Marsh were also surveyed. ROS Taylor, along with FWS pilots and Debbie Melvin of Parker River, also surveyed Parker River and Great Bay NWRs. The flights were the first in a number of years for both Rachel Carson and Parker River and the first ever for Great Bay. Since these were new survey routes there were kinks to work out and survey routes were adjusted between the two flights. Data was entered directly into laptop computers that voice-recorded observations and digitally recorded point of observation coordinates from the aircraft's Global Positioning Survey (GPS) unit.

Funding for the flights was provided by the Regional Biologist at Great Bay. As future funding allows, additional flights will be scheduled during migration and wintering periods. Costs will be lower once a Service pilot is stationed at Old Town, Maine in 1999.

On January 12, 1998 the state conducted a mid-winter inventory and flew the entire state's coastline. The refuge lies within unit 8 and is further broken down into subunits.



Table G-3. Unit 8 Subunit Summary.

Species	Mallard	Black Ducks	Common Goldeneye	Bufflehead	Old-squaw	Scoters	Common Eiders	Merganser	Canada Geese
Count	299	1605	243	214	246	760	3437	184	400

Common eiders, black ducks and scoters were the most numerous species present in unit 8. Total ducks observed was 7,394 down from 8199 on the 1997 survey.

Eleven ground and two aerial waterfowl surveys were conducted during the year and the data entered into the CENSUS database.

Refuge staff and volunteers sighted several black duck and mallard broods on the Moody, Lower and Upper Wells Divisions during the summer. In February, brant were observed in Biddeford Pool.

Common eider broods can be regularly observed at Biddeford Pool and the Goose Rocks area.

Canada Goose nests were found at the Drakes Island Marsh and along Smith Brook of the Goose Rocks Division. Canada geese also nest on several other divisions of the refuge.

#### 4. Marsh and Water Birds

Eleven species are documented to occur on the Refuge. Great blue heron, snowy egret and green-backed herons account for the majority of use by this group. Less commonly observed, but still present species include: little-blue heron, great egret, tri-colored heron, black-crowned night heron and glossy ibis.

The refuge provides essential staging and feeding areas for these species in southern Maine. During the spring, summer and fall months these birds spend time feeding in the extensive creeks and salt pannes on the refuge.

A western grebe was observed at Biddeford Pool in October and a red-throated loon in November.

#### 5. Shorebirds, Gulls, Terns and Allied Species

The refuge is utilized at various times of the year by up to 35 species of birds in this category. The Refuge saltmarshes, mudflats and salt pannes provide habitat for nesting, feeding and staging for these species. Purple sandpipers, sanderlings and dunlins winter along the Maine coast and can occasionally be found on the refuge during that time.

Key areas of high shorebird use on the refuge include the Webhannet River mud flats adjacent to oxcart lane and the Wells Harbor both located on the Lower Wells Division; the Little River mudflats on the Upper Wells Division; and Sampson's Cove on the Goose Rocks Division.



Twenty-three shorebird surveys were conducted during the year and data entered into the refuge Census database program.

Yellowlegs, black-bellied plover, semi-palmated plover, and sandpiper species are the most commonly observed shorebird species found on Rachel Carson NWR.

Several shorebird surveys were conducted during July-August as the fall migration got underway. Recorded species include: hudsonian godwit, whimbrel, willet, greater and lesser yellowlegs, short-billed dowitcher, black-bellied and semipalmated plover and semipalmated sandpiper.

Also observed during the year were Baird's and white-rumped sandpipers, American avocet and American golden-plover in Biddeford Pool. An American golden-plover was observed in Wells.

Gull species present on the refuge throughout the year are primarily greater black-backed and herring gulls. Other species likely to be seen at various times of the year include ring-billed gull and Bonapartes gull.

Common terns can be found throughout most of the refuge divisions. In the past, nesting has occurred behind the Wells Beach fire station and at Crescent Surf Beach.

An arctic tern was observed in Biddeford Pool in July as were over 300 common terns.

## 6. Raptors

Several species utilize the refuge during the year. Three species have been confirmed as breeding on the refuge--sharp-shinned and coopers hawks and great horned owl. The northern goshawk, red-shouldered, red-tailed and broad-winged hawks as well as the American kestrel and barred owl are probable breeders. Other species present at various times include: osprey, northern harrier, merlin, short-eared owl, northern saw-whet owl and snowy owl.

## 7. Other Migratory Birds

Throughout the refuge, 24 Eastern bluebird nest boxes are maintained. Most boxes are located in habitat more suitable for tree swallows and chickadees. Tree swallows accounted for slightly more than 50% of box use. Boxes were checked throughout the summer by refuge volunteers and interns.

Table G-4. Summary of 1998 nest box use.

Species	Tree Swallow	Black-Capped Chickadee	House Wren	Eastern Bluebird	No Use
# Boxes Used (fledged)	17(75)	4(17)	2(0)	2(8)	7

Nest boxes were again available on the saltmarsh off Shepards Way on the Brave Boat Harbor Division. A resident, who initiated the project as a natural means of mosquito control, is responsible for monitoring and maintaining 45 refuge nest boxes and is issued spring special use permits. An estimated 100 tree swallows fledged from these nest boxes. The boxes were donated to the individual and have an upper and lower nesting compartment. The Brave Boat Harbor resident will begin replacing dual-compartmented nest boxes with single compartment boxes that are easily accessible for cleaning out old nests.

Other interesting sightings include: Lincoln sparrows, five species of swallow, prothonotary warbler, snow bunting, and horned larks.

#### 8. Game Mammals

White-tailed deer are common throughout all of the refuge divisions. The Upper Wells Division contains the largest concentrations due to a State designated wildlife sanctuary that overlays and precludes hunting from the area.

Moose are being sighted more frequently on the refuge and can be seen on most of the divisions particularly the Upper Wells and Mousam River Divisions.

#### 9. Marine Mammals

Several harbor seal haul-out sites exist at the Brave Boat Harbor, Lower Wells, Mousam River and Goose Rocks Divisions. The most frequently utilized site is the marsh near the Wells Harbor on the Lower Wells Division. As many as 25 seals can be observed here during various times of the year.

#### 10. Other Resident Wildlife

Over 47 species of mammals (including marine mammals) can or have been reported on the Rachel Carson NWR. The refuge supports many species including beaver, river otter, porcupine, and fisher. For some species, such as the pine vole, the only state records are from refuge areas.

Staff began documenting refuge sightings of cottontail rabbits. The Maine Department of Inland Fisheries is trying to determine the status of the species in Maine as well as whether or not the species warrant listing under the State Endangered Species Act. One sighting at the Spurwink River in August has been documented so far. A University of New Hampshire graduate student will be working on the project in 1999.

Ruffed grouse are common nesters on the refuge and can be found on all divisions.

A wild turkey was observed on the Upper Wells Division in May.

#### 11. Fisheries Resources

12. Wildlife Propagation and Socking

13. Surplus Animal Disposal

14. Scientific Collections

15. Animal Control

No other trapping was conducted on the refuge in 1998. Trapping efforts in the past involve predator removal in conjunction with piping plover management.

16. Marking and Banding

No waterfowl banding was conducted at Rachel Carson NWR in 1998.

17. Disease Prevention and Control

## **H. PUBLIC USE**

1. General

The total number of national and international visitors to the refuge exceeded 248,000. The vast majority enjoyed nature observation, photography, hunting, environmental education and interpretation. We trust that the individuals, couples, families, school children, teachers, day campers, and bus tourists who came to the refuge returned home enriched and more learned about the refuge and its significance.

Three college interns, Heather Hamilton, Mark Slomiany, and Michelle Marceau, worked for 12 weeks between May and August. They offered visitor programs and kept the visitor contact station open at least four hours daily on weekends and holidays.

The station improved its educational outreach. To better express our planning and management programs, ORP Bloomfield wrote 14 press releases that were subsequently printed in local newspapers. Local media also ran two community access advertisements and one public service announcement. The local, county newspaper printed nearly all submitted press releases. ORP Bloomfield developed several refuge descriptions; these were printed in summer/tourist newspaper supplements for the Sun-Journal (Lewiston, ME), York County Coast Star, Boston Phoenix, and the Family Paper (southern Maine). Refuge staff produced a nearly 1000-word article for a land conservation supplement by the York County (ME) Coast Star that described the USFWS mission and land acquisition procedures.



## 2. Outdoor Classrooms - Students

Teachers used the refuge for outdoor education this year. School children made scheduled visits from local communities (Kennebunk, Kennebunkport, Limerick, Wells) and Massachusetts (Lexington) to learn about general biology, ecology, Rachel Carson, wildlife refuge management, and a host of other topics. Refuge staff provided teachers with written information before their visit and offered brief, on-site orientations when possible. The Fairfield School, Biddeford, conducted outdoor classrooms for approximately one-hundred and fifty kindergarten and first grade students on the Little River Division. Seven students from the University of New England used part of the Goosefare Brook Division's salt marsh for wetland education.

The annual "Monarch Butterfly Experience" took place along the Carson Trail in September. Thirty-five Wells Learning School, preschool children dressed in butterfly costumes and "flew" along the trail, simulating the annual, southern monarch butterfly migration. They completed their journey in the refuge picnic area, which volunteer parents and grandparents creatively transformed into "Mexico."

During the summer and fall, local scout groups from Kittery, Sanford, and Kennebunk walked the Carson Trail. A Kittery Girl Scout troop listened to a talk by ORP Bloomfield about wild versus tame animals.

## 3. Outdoor Classrooms-Teachers

## 4. Interpretive Foot Trails

Over 119,000 visitors walked the one-mile, self-guided Carson Trail in 1998. The busiest months were July, May, and August. Southern Maine experienced many continuous days of rain in late May and most of June. Only the most committed trail walkers ventured out. Two attempts to offer a beginner's bird walk on the trail to celebrate International Migratory Bird Day were rained out. An approximately 40-yard section of the trail sloughed into the Branch Brook in March. A safe, temporary trail was cut to avoid the hazard. Interns rerouted the trail and replaced railings in early summer.

## 5. Interpretive Tour Routes

## 6. Interpretive Exhibits/Demonstrations

The first college intern on board rejuvenated our interpretive kiosk by updating information and replacing faded photographs. New, portable interpretive panels were added to the visitor contact station.

In September, ORP Bloomfield represented the refuge at the Piscataqua Garden Club Flower Show in York, Maine. We participated in the event, a tribute to Marion Prince Hosmer, to recognize the Hosmer family's significant land donations to the refuge. The refuge display won

an award of appreciation from the judges.

## 7. Other Interpretive Programs

ORP Bloomfield presented a lecture/discussion on endangered species protection and the Convention on International Trade in Endangered Species. The April program took place before approximately 30 University of New England students in Biddeford, Maine.

Each intern offered one program this summer. Topics were: a reading and discussion of Rachel Carson's Sea Around Us, southern Maine geology, and use of prescribed fire for habitat management.

Educational Brochures: Efforts continue to create a Rachel Carson NWR general brochure. The text is complete, an historic photograph secured, and most graphics have been selected. The great impediment to the process is the loss of production and printing capability at the Regional Office. This project is on hold, along with the reprinting our popular bird checklist.

Three long-sought handouts were added to our educational material. "Publications About Rachel Carson -- Adult Titles," "Publications About Rachel Carson -- Children's Titles," and "Publications by Rachel Carson." These were largely researched by a volunteer.

ORP Bloomfield began a continuous list of wildflowers blooming along the Carson Trail. She updated it on a daily or weekly basis. The list was posted on the outdoor information kiosk, and received many positive comments from visitors.

Added to our Interpretive information for children were a "Carson Trail Treasure Hunt" handout and an update of our station's Children's Activity Book. Several pages were rewritten to better reflect refuge work and general, appropriate messages.

This year, the station began two foreign language translations of the Carson Trail guide. A French translation is nearing completion, thanks to a cooperative effort between volunteers. A basic, handwritten, German translation was offered to the refuge by an annual, foreign visitor. A translator is currently reviewing, retyping and refining that product. The latter work was kindly offered by ORP Bloomfield's friend and her professional language colleagues.

In September, Glenn Evans of the Friends of Rachel Carson NWR led a trip to 16 members of The National Audubon Society. They visited several divisions of the refuge.

## 8. Hunting

The Rachel Carson NWR is open for hunting white-tailed deer (archery and firearm), migratory birds (ducks, geese, woodcock, snipe), and upland game birds (ruffed grouse, pheasant, and quail). The refuge also allows falconry during a special season set by the state.

Hunt permits and fees are based on species sought (see section D.2.). For the third consecutive year, the number of permits issued up from 245 in 1997 to 325 (see Table H-1). Because hunters could have combination permits issued during different seasons (i.e., deer and migratory bird), the actual number of permits per category is greater than 325. Hunters spent an estimated 2,500 days hunting on the refuge.

Table H-1.

1998-1999 Hunting Season - Number of Permits Issued Per Category				
Deer	Migratory Birds	Pheasant	Falconry	Total
222	95	39	3	359
62%	26%	11%	1%	100%

#### 9. Fishing

The refuge is not currently open to fishing. As part of the Comprehensive Conservation Planning effort, the refuge has received comments in support of allowing fishing on some refuge lands. A state fishery biologist, the Coastal Conservation Association, and a local fishing club have all raised the issue. With the help of these groups and Service personnel, it is anticipated that the refuge will open some waters to recreational fishing.

#### 10. Trapping

#### 11. Wildlife Observation

The refuge won two wildlife-related awards this year. The local, weekly newspaper, *The York County Coast Star*, ran its first annual "Best Of" contest in 1998. It invited readers to select "The Best. . . (restaurant, service, beach, etc.) in the County. The refuge won 1<sup>st</sup> place for "Best Birdwatching" and 2<sup>nd</sup> place for "Best Deer and Moose Watching." Certificates were handed out at an August gala at a local restaurant; it was also a successful fund-raising event for the Maine State Chapter of the March of Dimes. ORP Bloomfield attended and provided refuge information to many of the 300 attendees.

#### 12. Other Wildlife Oriented Recreation

#### 13. Camping

#### 14. Picnicking

#### 15. Off-Road Vehicling

#### 16. Other Non-Wildlife Oriented Recreation



## 17. Law Enforcement (LE)

Rachel Carson NWR encompasses approximately 4,800 acres in 10 divisions and FmHA easements along 60 miles of the southern Maine coast. This area of Maine receives approximately 7 million visitors a year, mostly during the summer, but expanding into early spring and late fall. Consequently there are numerous violations occur; but there are only three collateral duty officers to canvas Rachel Carson's vast acreage.

We estimate that approximately 5,000-10,000 violations occur on the refuge annually, approximately 1.3 - 2.7 violations/division/day. Violations that were either reported to the refuge or evidence found include: vehicle trespass (4x4, various types of watercraft, ATV, snowmobile, bicycle); illegal parking; general trespass (foot, ski, horse, dogs); dogs off leash/running deer; plant collecting/cutting vegetation; illegal hunting and fishing; target shooting; fires; dumping; and vandalism.

In August, ROS Taylor received a call at home from the Wells Police Department regarding a vehicle in the Webhannet River of Oxcart Lane. Wells officers collected information from the individual and provided that information to the refuge. The individual was charged with vehicle trespass.

ROS Taylor and RM Feurt worked opening day of the firearm deer season. No hunting violations were encountered that day. Violations encountered during the hunting season included hunting pheasant with lead shot. Other violations included, unconfined animal and general trespass.

Refuge officers also provided coverage during the Great Bay deer hunt in November. Most of the incidents/violations have been entered into the Law Enforcement Information Reporting (LEIR) system. Rachel Carson's annual LE report was completed in March.

RM Feurt, DRM Kimbrell-Anderson and ROS Taylor attended LE Refresher training at NCTC in April. Refuge officers successfully qualified with their duty weapons in November.

## 18. Cooperative Construction

## 19. Concessions

# **I. EQUIPMENT AND FACILITIES**

## 1. New Construction

## 2. Rehabilitation

Water and electricity were connected/turned on at the Rust house and Grant cabin in May prior to

three Interns and an SCEP student moving in for the summer. The Grant cabin was occupied by two forestry technicians.

In June and July this year Maine Department of Environmental Protection personnel performed a lead paint and asbestos inspection on all refuge facilities, i.e. headquarters, residence, Dyer house in Biddeford Pool and Rust and Grant cabins on Granite Point Road. The Wells' buildings were free from lead, but all of the other houses had extensive lead paint. Floor tiles and vinyl covering at all locations were possible asbestos containing materials.

### 3. Major Maintenance

In January, the Carson Trail was closed for about one week to clean up downed trees and limbs from Ice Storm '98's second attack. Staff had to chainsaw their way through the entrance road to gain access to the headquarters office and residence.

In April, a complete section of the Carson Trail, between stops 4 and 5, fell into Branch Brook. Approximately 40 feet of trail was lost and had to be re-routed. Interns and the SCEP student carved out and constructed a new section during the summer. The railings that had been constructed in 1997, to keep visitors away from the edge on that portion of the trail, fell into the brook as well. This is the second time, since initial construction, that this particular section of trail has been relocated due to erosion.

The Rust house and Grant cabin on the Little River Division were checked during March. The Rust house needs to have the chimney re-flashed, but is completely furnished for interns. The septic tanks/cisterns were pumped in October at the HQ residence, Rust House and Grant Cabin. The cistern was finally located for the Dyer house at Biddeford Pool and will be covered with a cement cap in the spring of 1999. Cistern covers at the Grant cabin and Dyer House were fabricated with wood, both decaying. The Grant Cabin's decayed cover, a safety hazard, was replaced with a cement cap.

Boundary posting on refuge lands is an on-going yearly process pending available staff and/or trained volunteers. Staff and volunteer posting efforts during the field season were focused on acquired tracts not previously posted. Approximately 100 acres of land were posted. Throughout the year, additional efforts involve replacing weathered and worn signs.

### 4. Equipment Utilization and Replacement

In the Spring, the refuge acquired a fifth wheel International truck, excedded by the Air Force at Patrick AFB, FL. Walkill NWR, NJ staff drove the vehicle from Patrick AFB to Walkill NWR. On a return training trip from NCTC in March, ROS Taylor picked up the truck and drove it the remainder of the way from Walkill NWR to Rachel Carson. In late fall, the truck was serviced and outfitted with a pintle hook to haul our new Hudson lowboy trailer, purchased in early fall. We can now move some borrowed equipment around refuge divisions to get work done.

In the fall, a new 4x4 ATV, 15-gallon sprayer, disc harrow, and a 6' rototiller were delivered—purchased with both fire and station funds. The equipment will be used for prescribed burning, fire break construction, and grassland management.

In late summer, a Ford Explorer was transferred to Rachel Carson NWR from the Regional biologist at Great Bay NWR.

#### 5. Communications Systems

The refuge shares a high band frequency with all refuges in Maine and as well as Great Bay NWR in New Hampshire. Unfortunately, a base station is not authorized; authorization is limited to portable and mobile units. Consequently, communication is nonexistent when distance between radios is more than a couple of miles away.

Rachel Carson and Great Bay will be receiving excess mobile units from the west coast some time in FY 1999.

#### 6. Computer Systems

ROS Taylor received a SPSS statistics package during NCTC CENSUS training in March.

Everyone received a Y2K-compatible CC Mail upgrade. A new color laser jet printer was received late in the year. The administrative assistant received a new, larger monitor and a modem upgrade to 56K.

A computer was loaned to newly established Aroostock NWR, ME in the fall.

#### 7. Energy Conservation

#### 8. Other

### J. OTHER ITEMS

#### 1. Cooperative Programs

#### 2. Other Economic Uses

#### 3. Items of Interest

#### 4. Credits

### K. FEEDBACK

### L. INFORMATION PACKETS—Inside Back Cover